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# The Abou-Rass 4R Operational Diagnosis Protocol: Advancing Endodontic and Dental Diagnostics

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The Abou-Rass 4R Operational Diagnosis Protocol (4ROD) is a valuable clinical diagnostic method primarily designed for endodontics. However, after years of using the protocol in teaching and practice, it has been found that many aspects of the protocol are applicable and most beneficial for general dentistry practitioners doing endodontics associated with prosthodontics and periodontic procedures. Therefore, the value of the protocol is not limited to endodontic diagnostics but to dental diagnostics in general.

The 4ROD was first envisioned when I was an advanced endodontic resident at the University of Pittsburgh in 1968, and it continued for 20 consecutive years in USC's academic teaching and clinical instruction and publications. In 1999, I introduced it to advanced general dental and endodontic training in the Kingdom of Saudi Arabia.

There have been five revisions to the protocol, the most recent for the Abou-Rass Endodontics Academy (AEA). Operationalism distinguishes the protocol from other methods for evaluating endodontic health diagnostics. It involves physical examination, which includes removing caries and crowns, restorations in non-surgical endodontics, and raising a flap or doing an apical curettage in surgical endodontics. This allows reality findings compared to interpreting radiographs, superficial probing of margins, or a periodontal pocket.

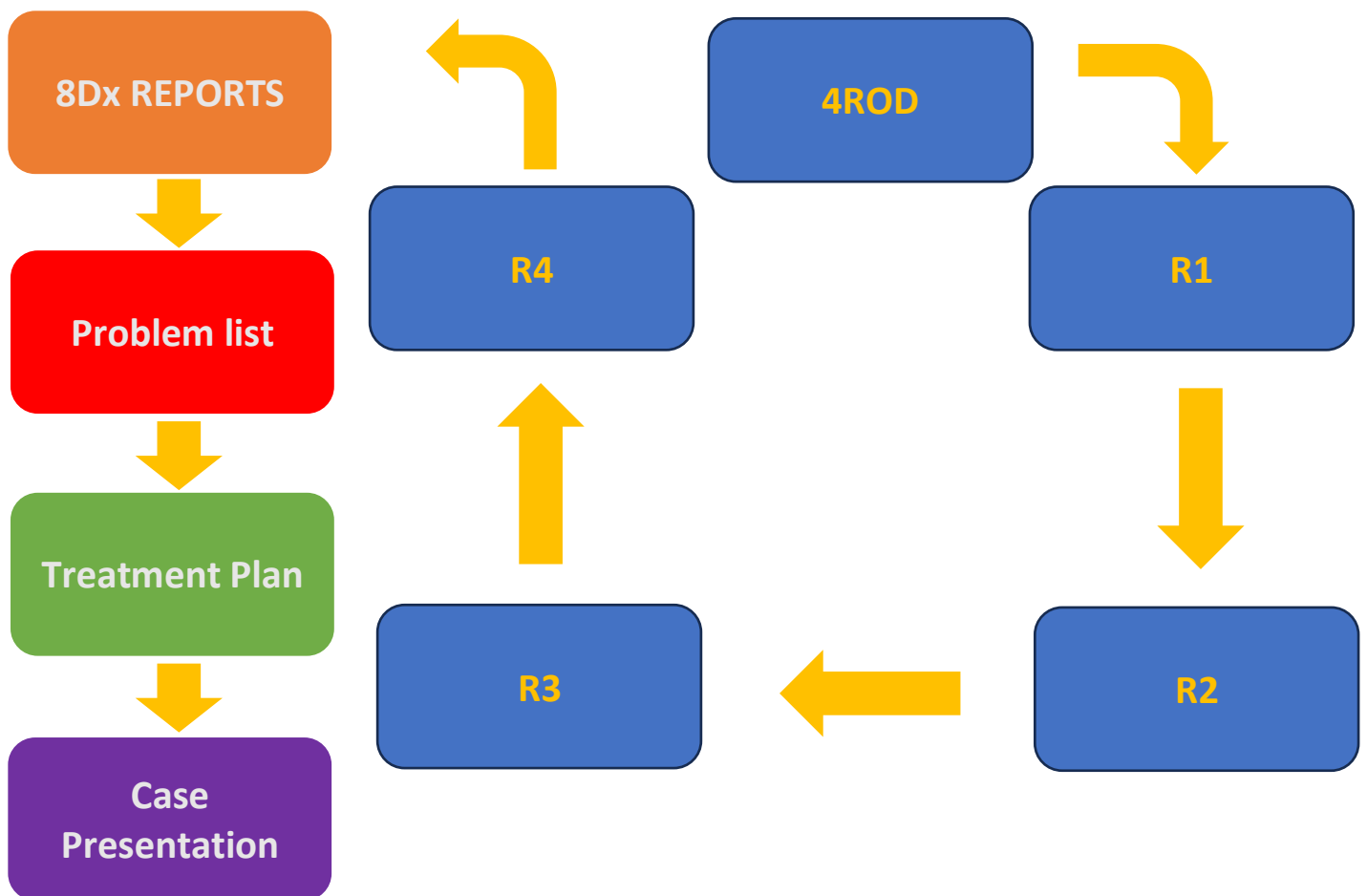
Operationalism is based on what I learned from my mentor, The late Andrew Michanowicz, when I was a graduate student with a periapical radiograph in my hand for an endodontic issue; he looked at it, looked at me, and said, "Marwan, don't ask. Let's see what happens when the restoration is removed. Let's open and see!

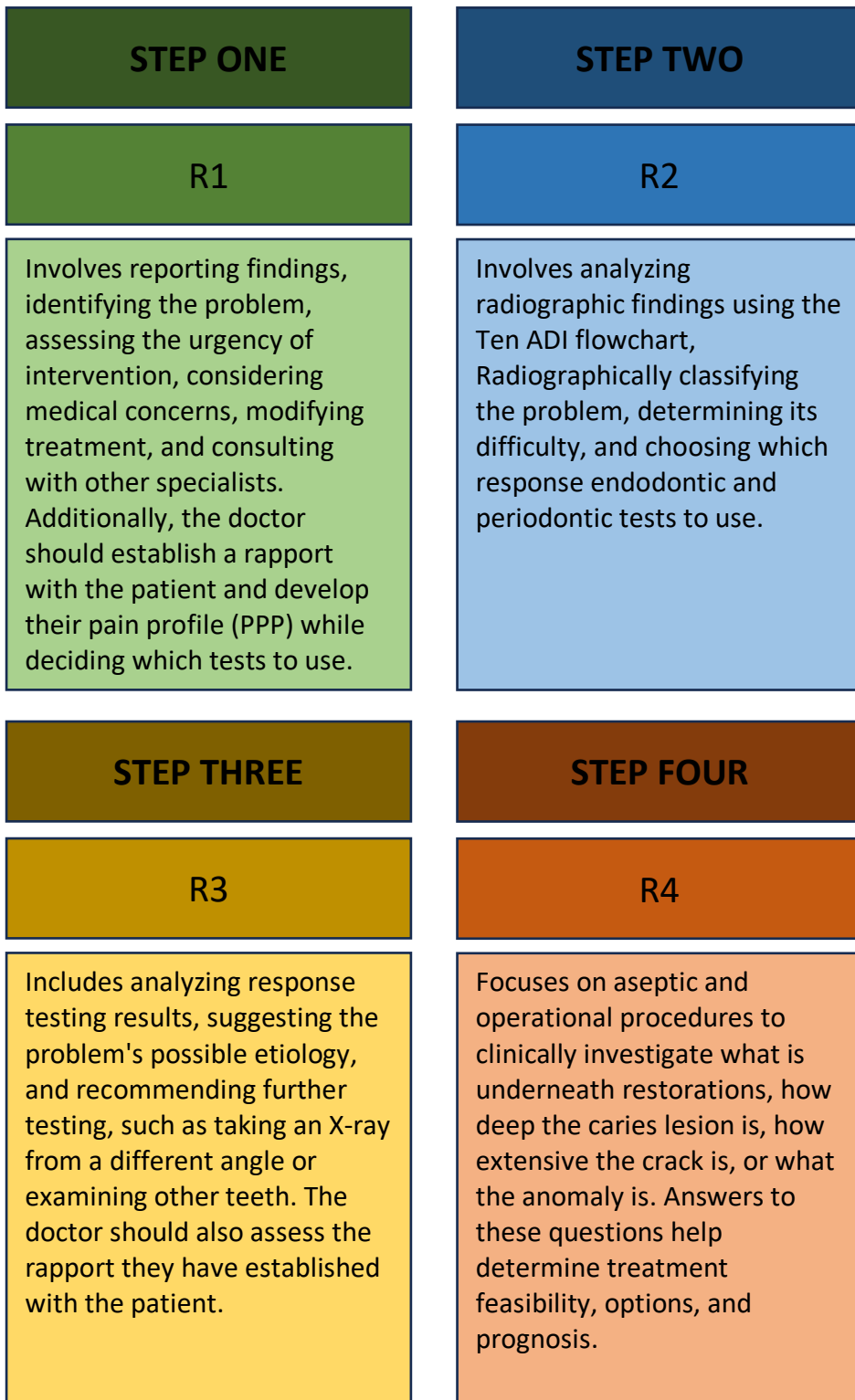
"Operationalism" revolves around stepping in, observing, teasing out, and gathering actual data instead of relying on radiographic images or merely looking.

The protocol is an established clinical diagnostic method based on evidence-based guidelines. It integrates clinically accepted biological norms with the physical examination of the dentition, focusing on investigating and evaluating the tooth Endodontium and Periodontium data. It is valuable for the general dentistry practitioner because it applies to a single tooth, a quadrant of teeth, or an entire dentition.

## The Abou-Rass 4R Operational Diagnosis Protocol

The protocol consists of four steps that must be followed in strict order. The purpose of each step is to collect diagnostic data related to endodontic biology, pathology, diagnosis, treatment, and outcomes.





Each step's academic and clinical content is organized into a module, which includes an introduction and various parts designed to work together for effective learning. These parts typically include a video introduction and several video presentations.

## R1 Module I: Reports Findings

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The protocol's first step. Deals with the Doctor-Patient patient's first encounter. Module I aims to establish a solid patient-practitioner relationship by creating a favorable first impression. R1- Module I includes a video introduction and six parts of video presentations, which are:

1. Abou-Rass 4ROD - Step 1 –R1 Report Findings - Introduction
2. Part 2 Doctor-Patient First Meeting
3. Part 3 Patient Care Coordinator
4. Part 4 Patient's Pain Threshold
5. Part 5 Patient's Pain Profile Questionnaire
6. Part 6 Initial Oral Exam
7. Part 7 One-on-One Findings

Each part is a video presentation. A significant takeaway from the R1 is Part 5- "Patient's Pain Profile Questionnaire," which I refer to as PPPQ or the patient's pain profile. It's a questionnaire that's been in use in teaching and practice for almost 50 years. PPPQ It helps the clinician categorize the patient's symptoms and develop a working diagnostic profile. The R1 findings set the stage and needs of R2 and R3 steps.

## R2 Module II: Radiographic Findings

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Introduces the ten areas of diagnostic interest (10 ADI), An evidence-based approach for radiographic diagnosis of intact and infected alveolar sockets. The 10 ADI will assist in employing a systematic approach to interpreting radiographs, specifically periapical and bitewing. R2- Module II includes a video introduction and ten parts of video presentations, which are:

1. Part 1: Introduction The 10 ADI
2. Part 2 ADI 1 - Clinical Crown
3. Part 3 ADI 2 - Pulp Chamber
4. Part 4 ADI 3 - Root Canal Proper
5. Part 5 ADI 4 - Root Apex
6. Parts 6 and 7 ADI 5 and 6 - Lamina Dura and Periodontal Ligament Space
7. Part 8 ADI 7 - Periapical Bone
8. Part 9 ADI 8 – Peri-radicular Bone
9. Part 10 ADI 9 - Alveolar Bone Crest
10. Part 11 ADI 10 - Adjacent Problems

## **R3 Module III: Response Testing Findings**

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In R3, the third step of the protocol focuses on pulpal responses to cold stimuli, physical examination, and response analysis of the gingival and periodontal health conditions of the involved tooth or quadrant.

R3 focuses on collecting more periodontal data because of the biological and clinical relationship between endodontics and periodontics. R3- Module III includes a video introduction and ten parts of video presentations, which are:

1. Abou-Rass 4ROD - Step 3 - R3 Response Tests Findings - Introduction
2. Part 1 Electric Pulp Test: Questions of Relevance and Accuracy
3. Part 2 Heat Pulp Test: How Necessary?
4. Part 3 Cold Pulp Test: The Standard of Care
5. Part 4 Percussion and Bite Tests
6. Part 5 Fistula Tracking Test: A Standard of Care
7. Part 6 Periodontal Tests
8. Part 7 How To Develop and Analyze Patient Pain Profile

## **R4 Module IV: Restorative and Tooth Structure Findings**

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R4 is the fourth step and most critical step of the protocol. In R4, the clinician must integrate the findings of R1, R2, and R3 and identify the problem. R4 is the most operational and may include Intra-coronal restoration, crowns and bridge removal, Deep caries removal, coronal clean-out, ETT removal of pulp chamber content, or root canal fillings removal. R4-Module IV includes a video introduction and ten parts of video presentations, which are:

1. Abou-Rass 4ROD - Step 4 - R4 Restorative and Tooth Structure Findings - Introduction
2. Part 2 Evaluation of Teeth with Direct and Indirect Restorations
3. Part 3 Evaluation of Crowned Teeth
4. Part 4 The Significance of Tooth Discoloration
5. Part 5 Tooth Erosion and Attrition
6. Part 6 Tooth Anomalies of Endodontic and Periodontic Relevance§
7. Part 7 Tooth Alignment and Occlusion of Endodontic and Periodontic Relevance

R1, R2, R3, and R4 findings provide eight diagnostic reports. A problem list is generated from these reports. A list of endodontic problems, prosthodontics problems, periodontic problems, orthodontic problems, etc.? From that, a treatment plan is generated.

## The 4ROD-Eight Diagnostic Findings Reports

<b>R1:</b>	Report Findings	<ul style="list-style-type: none"><li>▪ Medical, Social, Personal HX</li><li>▪ Patient Pain Profile HX</li></ul>
<b>R2:</b>	Radiographic Findings	<ul style="list-style-type: none"><li>▪ The 10 ADI (Areas of Diagnostic Interest)</li></ul>
<b>R3:</b>	Response Testing Findings	<ul style="list-style-type: none"><li>▪ Pulp Response</li><li>▪ Periodontal Response</li></ul>
<b>R4:</b>	Restorative & Tooth Structures Findings	<ul style="list-style-type: none"><li>▪ Crown Findings</li><li>▪ Chamber Findings</li><li>▪ Canal Findings</li></ul>

7

*Abou-Rass Master Class*

## The 4ROD-powers and Advantages in Endodontic Education and Practice

The 4ROD is a best practice in patient-centered care diagnostics.

The 4R operational diagnosis protocol focuses on patients as individuals and partners in healthcare decision-making. It also focuses on understanding and addressing the patient's needs, preferences, values, and goals.

### 1 Improved patient experience

Patients who undergo the 4ROD report feeling more empowered and informed about their dental problems and oral health in General. This helps reduce anxiety and improve overall satisfaction with dental care, build trust, and a large base of loyal patients.

**2**

## **Excellent Doctor Patient's Rapport**

Well-implemented 4ROD establishes a solid relationship between the practitioner and the patient. This paves the way for case acceptance of cooperative and compliant patients.

**3**

## **Evidence-based Clinical Guidelines**

All the diagnostic, behavioral, practice, and patient management guidelines used in the protocol are based on the best available scientific evidence or widely accepted clinical practices. This ensures that patients receive dental treatments that have been proven effective and safe.

**4**

## **Multidisciplinary Perspective**

Recognition of the biological relationship between the Endodontium and periodontium in diagnosis and treatment related to the different clinical care specialties.

**5**

## **Operationalism**

Elimination of diagnostic uncertainty and speculation through the performance of procedures that would lead to the desired objective.

**6**

## **Reduced Risk of Diagnostic Errors**

4ROD examines the relevant components of the tooth in question: Endodontium, Periodontium, occlusion, and the past, current, and future dental treatments involving the tooth. This level of scrutiny can help clinicians identify potential issues before they become serious problems.

**7**

## **Preventive Diagnostics Advantage**

By physical examination, open and see operationalism, the 4ROD is a preventative best practice as it uncovers occult pathologies, cracks, resorptions, caries, untreated root canals, and various asymptomatic dental problems at the early stages. This early detection of dental issues leads to more effective, economical, and less invasive treatment options.

**8**

## **Customization of Testing**

Customization of the testing procedure to duplicate the patient's symptoms by selecting the most relevant test.

**9**

## **Documentation**

The 4 Phases of the protocol require detailed documentation of the findings. Therefore, a properly conducted 4ROD provides the practitioner with ideal diagnostic record-keeping.

**10**

## **Teaching and Training Advantages**

4ROD provides a standardized diagnosis and treatment planning approach in the teaching environment. Strict and monitored usage of the protocol prevents the use of unsupported personal guidelines and biases. It provides the learner with a clear road map to satisfying the patient, making an accurate diagnosis, and planning proper treatment.



# Master Class Learning Objectives:

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## **R1 PART 2: Doctor-Patient First Meeting**

- ✓ List the essentials of an efficient first doctor-patient meeting.
- ✓ Describe the recommended essentials.
- ✓ “Know” the patient by reviewing the protocol’s four patients' histories.
- ✓ Recognize patient’s “Likes”
- ✓ Recognize patient’s “Dislikes”

## **R1 PART 3: Patient Care Coordinator**

- ✓ Describe what could go wrong without PCC in dental practice.
- ✓ Outline the advantages of having PCCS on Dental Practice staff.
- ✓ Describe PCC responsibilities in the 4ROD Protocol.

## **R1 PART 4: Patient’s Pain Threshold**

- ✓ Discuss the reasons why diagnosis of orofacial pain is difficult.
- ✓ Discuss the advantages of knowing the patient’s pain threshold.
- ✓ Define and determine the patient’s pain threshold, tolerance, and role in the delivery of dental care.
- ✓ List pain threshold influencing factors.
- ✓ Discuss the criteria of the patient's pain profile.

## **R1 PART 5: Patient Pain Profile Questionnaire**

- ✓ Review concepts in pain assessment using verbal descriptors.
- ✓ Learn How to use the patient Pain Profile color-coded sections.
- ✓ Learn how to review PPPQ with patients.

## **R1 PART 6: Initial Oral Exam**

- ✓ In Preparation for the Initial Oral Exam, observe strict infection control and protective personal equipment guidelines.
- ✓ Explain to the patient the purpose of the initial exam.
- ✓ List the essentials of the Initial Oral Exam
- ✓ Present to the Patient the initial oral exam findings

## **R1 PART 7: One-On-One Findings**

- ✓ Congratulate the patient on the positive findings of the oral exam.
- ✓ Provide a detailed description of the oral exam findings in Oral Hygiene, Cariology, Periodontics, Endodontics, restorative Dentistry, and orthodontics.

## **R2 PART 1 - The 10 ADI Introduction**

- ✓ Enhance the value of Periapical and Bitewing Radiographs using the 10 ADI for radiographic interpretation.
- ✓ Recite Brynof's 1967 research as the scientific evidence for using the concept of areas of diagnostic interest.
- ✓ Discuss each of the 10 ADI and memorize the central incisor and molar tooth flowchart.
- ✓ Show clinical examples of using the 10 ADI in interpreting PA radiographs of endodontic pathologies.
- ✓ Recognize the limitations of Orthopantograph OPG in diagnostic radiology.

## **R2 PART 2 - ADI 1 - Clinical Crown**

- ✓ Recognize the image of healthy pulp chambers of posterior teeth in comparison to unhealthy pulp chambers.
- ✓ Review radiographs of dental caries, resorption, anomalies, tooth structured loss, and acceptable and unacceptable restorations. Observe the effects of these conditions on the pulp chamber and other ADI.
- ✓ Review the images of EUT and ETT before and after the crown removal
- ✓ Review case studies of radiographically acceptable crowns. However, with a complete breakdown of the tooth structure under the crown

## **R2 PART 3 - ADI 2 - Pulp Chamber**

- ✓ Describe the anatomy of pulp chambers of posterior teeth focusing on Buccal Pulp horns and their clinical significance.
- ✓ List the criteria to evaluate the images of the pulp chambers of posterior teeth.
- ✓ Clinically correlate the images of a sampling of the pulp chambers with conditions or pathologies of endodontic relevance.
- ✓ Describe the structure of pulp stone and classify pulpal calcification images.
- ✓ Discuss the chamber constriction problem and its clinical implications.

## **R2 PART 4 - ADI 3 – Root Canal Proper**

- ✓ Use periapical radiographs to interpret the normal, abnormal, and pathologic findings of the images of root canal proper of Endodontic Untreated (EUT) and Endodontic Treated Teeth (ETT)
- ✓ Recognize the most common root canal anatomy, configurations, and apical third-diameter measurements.

## **R2 PART 5 - ADI 4 - Root Apex**

- ✓ Interpret periapical radiographs of the teeth with apices that are normal or with resorption, calcifications, and iatrogenic perforations, and describe the clinical management of each.

## **R2 PARTS 6 and 7 - ADI 5 AND 6 - Lamina Dura and Periodontal Ligament Space**

- ✓ Recognize the importance of the lamina dura (LD) and periodontal ligament space (PdL) as the best aid in diagnostic radiography.
- ✓ Learn the LD and PdL imaging influencing factors.
- ✓ Recognize localized and systemic health/disease in LD and PdL space radiographs.

## **R2 PART 8 - ADI 7 - Periapical Bone**

- ✓ Develop an in-depth understanding of apical periodontitis's Bacterial, Histologic, and radiographic aspects.
- ✓ Analyze the consequences of not treating apical period.
- ✓ Compare the accuracy of PA, BW, OPG, and CBCT in detecting Apical Periodontitis.

## **R2 PART 9 - ADI 8 - Peri-radicular Bone**

- ✓ Perform differential diagnosis of peri-radicular radiolucencies of endodontic or periodontic.

## **R2 PART 10 - ADI 9 - Alveolar Bone Crest**

- ✓ Review the anatomic considerations and the Influencing factors that affect radiographic imaging of the Alveolar Bone Crest.

## **R2 PART 11 - ADI 10 - Adjacent Problems**

- ✓ Describe the concept of Occult problems in dental care and review study cases.
- ✓ Adopt the concept of 4ROD-Quadrant Diagnosis as the minimal standard in Oral Healthcare Diagnostics.

## **R3 PART 1 - Electric Pulp Test: Questions of Relevance and Accuracy**

- ✓ Review examples of EPT units from the past century.
- ✓ List the EPT factors that cause false positive and negative results.
- ✓ List the rationale for avoiding the use of EPT in Pulp Testing.

## **R3 PART 2 - Heat Pulp Test: How Necessary?**

- ✓ Recognize the limitations, disadvantages, or risks of Heat Pulp Testing.
- ✓ Review heat pulp tests methods used in endodontics.

## **R3 PART 3 - Cold Pulp Test: The Standard of Care**

- ✓ Recognize CPT as the only evidence and consensus-based pulp response test in endodontic diagnostics.
- ✓ Review the mechanism of CO<sub>2</sub> ice testing as a model for cold testing.

### **R3 PART 4 – Percussion and Bite Tests**

- ✓ Recognize when to use the percussion tests in Endodontic and periodontic diagnostics.
- ✓ Recognize the limitations of the cavity and bite tests.
- ✓ Adopt Performing the ROTC routinely in General Practice.

### **R3 PART 5 - Fistula Tracking Test: A Standard of Care**

- ✓ Describe the pathogenesis of oral fistulae of dental origin.
- ✓ Recognize the diagnostic benefits of the Fistula tracking test.
- ✓ Perform a fistula-tracking test.
- ✓ Review case studies demonstrating the importance of fistula-tracking test.

### **R3 PART 6 - Periodontal Tests**

- ✓ Understand the importance of incorporating periodontal and prosthodontic diagnostics in an endodontic case diagnosis.
- ✓ Perform the five standard periodontal tests for patients requiring endodontic care.
- ✓ Recognize the Gingival, Periodontal, and pulpal pathologies associated with poor restorations.

### **R3 PART 7 - How To Develop and Analyze Patient Pain Profile**

- ✓ Using the Patient's Pain Profile questionnaire, You should be able to diagnose the following Endodontic Disease Conditions:
  - Symptomatic Irreversible Pulpitis
  - Symptomatic Reversible Pulpitis
  - Symptomatic Irreversible Pulpitis
  - Symptomatic Apical Abscess
  - Symptomatic Apical Periodontitis
  - Periodontal Abscess

### **R4 PART 2 - Evaluation of Teeth with Direct and Indirect Restorations**

- ✓ Learn the FDI criteria for evaluating direct and indirect restorations, updates, and clinical examples.
- ✓ Recognize the damaging effects of poor-quality restorations on the survival of restorative, prosthodontic, and endodontic treatments.
- ✓ Discuss the Coronal Microleakage role in pulpal, periodontal health and endodontic treatment.
- ✓ Recognize the Importance of Radiographic Evaluation in Addition to the Clinical and Visual Evaluation.

### **R4 PART 3 - Evaluation of Crowned Teeth**

- ✓ Learn the criteria for evaluating crowned teeth using the 2023 FDI guidelines.
- ✓ Recognize the damage the poor-quality crowns on the survival of restorative, prosthodontic, and endodontic treatments.

- ✓ Recognize the effects of Coronal Microleakage of poor-quality crowns on pulpal, periodontal health, and endodontic treatment.
- ✓ Recognize the Importance of Radiographic Evaluation in Addition to the Clinical and Visual Evaluation.
- ✓ Learn the concept of clinical and radiographic warning signs to prevent endodontic Periodontic disease and educate the patient.

#### **R4 PART 4 – The Significance of Tooth Discoloration**

- ✓ Recognize the clinical and biological relationship between tooth color and Pulpal and Periapical health.
- ✓ Recognize the clinical and biological relationship between tooth color and Quality of Endodontic Treatment.
- ✓ Recognize the clinical and biological relationship between tooth color and Restorative Dentistry.
- ✓ Recognize the clinical and biological relationship between tooth color and Systematic Disease.

#### **R4 PART 5 - Tooth Erosion and Attrition**

- ✓ Recognize tooth surface Erosion, Attrition, and Abrasion as pathologic conditions that affect the physiology, anatomy, and aesthetic functions of the patient's dental Occlusion, Periodontal, and Pulpal health.
- ✓ Recognize the causes and differential diagnosis between attrition, erosion, and abrasion.
- ✓ Learn the pathologic consequences of tooth wear, focusing on the Endodontic implications.

#### **R4 PART 6 - Tooth Anomalies of Endodontic and Periodontic Relevance**

- ✓ Focus on the maxillary incisors during the dental examination to detect the Palatal Grooves. Review Oehler's classification.
- ✓ Learn the management of clinical Endodontic and Periodontic complications associated with the Palatal Grooves.
- ✓ Diagnose the anomaly Dens Evaginatus and Dens Invaginatus and discuss relevance to endodontics.

#### **R4 PART 7 - Tooth Alignment and Occlusion of Endodontic and Periodontic Relevance**

- ✓ Focus on occlusion and teeth alignment findings.
- ✓ Learn the effects of malocclusion on periodontal support of teeth.
- ✓ Recognize the drawbacks of correcting teeth misalignment through prosthodontic methods.
- ✓ Understand how correcting malocclusion and misalignment of teeth through orthodontics affects pulpal health.